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GLOBAL ENVIRONMENTAL RESEARCH AND POLICY ACT OF 1989

DECEMBER 15, 1989.—Ordered to be printed

Mr. JONES, of North Carolina, from the Committee on Merchant Marine and Fisheries, submitted the following

REPORT

[To accompany H.R. 3332]

[Including cost estimate of the Congressional Budget Office]

The Committee on Merchant Marine and Fisheries, to whom was referred the bill (H.R. 3332) to provide for development of a National Global Change Research Plan to coordinate oceanographic, atmospheric, terrestrial, and polar research programs; to direct the Council on Environmental Quality to advise the President on policies relating to global change; and for other purposes, having considered the same, report favorably thereon with an amendment and recommend that the bill as amended do pass.

The amendment is as follows:

Add at the end of the bill the following:

TITLE IV—INTERNATIONAL PROGRAMS IN GLOBAL CHANGE RESEARCH

SEC. 401. POLICY

It is the policy of the United States to—

(1) promote and support international cooperative research and assessment programs on understanding and responding to global change;

(2) involve scientists and policymakers from developing nations in such cooperative research and assessment programs; and

(3) promote international efforts to provide technical and other assistance to developing nations which will facilitate improvements in their domestic standard of living while minimizing damage to the global or regional environment.

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SEC. 402. INTERNATIONAL DISCUSSIONS.

(a) GLOBAL CHANGE RESEARCH.—The Secretary of State, in cooperation with the Committee shall initiate discussions with other nations leading toward in international protocol in global change research and assessment. Such discussions shall include the following issues:

(1) Allocation of costs in global change research and assessment programs, especially with respect to major capital projects.

(2) Management of global change research and assessment, especially with respect to coordination of national research and assessment plans and research and assessment plans developed by international organizations such as the International Council on Scientific Unions.

(3) Training centers for scientists from developing nations.

(4) Establishment of research and assessment centers in developing nations.

(5) Innovative methods for international research and assessment management, including—

(A) creation of an intergovernmental organization on global change research and assessment; and

(B) creation of a limited research and assessment foundation.

(6) The prompt establishment of international projects to—

(A) create globally accessible formats for data collected by various international sources; and

(B) combine and interpret data from various sources to produce information readily usable by policymakers attempting to formulate effective strategies for mitigating and adapting to the harmful effects of global change.

(b) ENERGY RESEARCH.—The Secretary of State, in cooperation with the Secretary of Energy, ~~shall~~ initiate discussions with other nations leading toward an international research protocol for environmentally safe energy technologies. Such discussion shall include the following issues:

(1) Creation of an international cooperative program to fund research related to energy efficiency, solar and other renewable energy sources, and inherently safe nuclear reactors.

(2) Creation of an international cooperative program to develop low cost energy technologies which are appropriate to the environmental, economic, and social needs of developing nations.

(3) Exchange of information concerning environmentally safe energy technologies and practices, including those described in paragraphs (1) and (2).

PURPOSE OF THE LEGISLATION

The purpose of H.R. 3332 is to provide the scientific information needed to achieve effective policies for addressing changes in the global climate and environment. The bill establishes a framework for coordinating federal agency research on greenhouse warming and other aspects of global environmental change. It also mandates the development and implementation of a 10-year global change research plan. H.R. 3332 directs the Council on Environmental Quality to advise the President on domestic and international policies relating to global change.

BACKGROUND AND NEED FOR LEGISLATION

In recent months, world attention has focused increasingly on changes in the Earth's climate and environment. Average global temperatures in the past decade have beeen the warmest on record. Droughts have devastated parts of India, Africa, and North America, and at the same time, heavy rainfall has occurred in traditionally arid regions of South America. Floods have threatened thousands in Bangladesh and the Sahara Desert is continuing its slow spread over northern Africa. The atmosphere's protective ozone layer is thinning perceptible, and each spring, ozone concentrations over Antarctica drop dramatically. Some of these environmental and climatic trends are a result of natural changes, but increasing evidence indicates that human activity is exerting a growing influence on the Earth system.

Earth's atmosphere and greenhouse effect

Essential to the habitability of the Earth is its enveloping blanket of air. The earth's atmosphere is relatively transparent to incoming sunlight which warms the planet's surface. However, when the planet gives off its excess heat, it does so, not with visible light, but with infrared radiation. Greenhouse gases, such as carbon dioxide. methane, chlorofluorocarbons (CFCs), ground-level ozone, and nitrous oxide, absorb some of this excess heat, trapping it in the lower atmosphere. The net result is an equilibrium, where temperatures at the Earth's surface are maintained at a level warmer than those which the Earth would otherwise experience if there were no intervening atmosphere. Without a heat-trapping atmosphere, the planet would have an average surface temperature as low as −4 degrees Fahrenheit, instead of the current average of 57 degrees Fahrenheit. However, it is possible to have to have too much of a good thing.

The greatest single contributor to the growth in greenhouse gases is carbon dioxide, which is a natural constituent of the atmosphere and is also released in large quantities by the combustion of fossil fuels. While human activities have contributed large amounts of carbon dioxide to the atmosphere since the beginning of the industrial revolution nearly 200 years ago, the majority of the carbon dioxide has been released in the last 30 years. Since the heat-trapping effect of greenhouse gases is additive, their buildup in the atmosphere is expected to cause long-term increases in average global temperature.

Concentrations of other greenhouse gases are also increasing. Collectively, methane, CFCs, ground-level ozone, and nitrous oxide contribute about as much as carbon dioxide to the greenhouse effect. Like carbon dioxide, many of these gases are natural atmospheric constituents linked, in varying degrees, to the burning of fossil fuels. Ground-level ozone, for instance, is a major constituent of urban smog derived principally from automobile emissions; methane, however, is a primary product of "natural" organic decomposition processes, and agriculture is a major source. Finally, the greenhouse contribution of ground-level (or trophospheric) ozone should be distinguished from the "shielding" effect of upper-atmospheric (or stratospheric) ozone. In the upper atmosphere, naturally occurring ozone shields the planet from harmful, ultraviolet radiation. In the lower atmosphere, ozone is a product of human activity and contributes to the greenhouse effect.

Estimating accurately the climatic effect of continued greenhouse gas emissions requires two things: predictions of future emissions and quantitative models of the climate system. Currently, it is expected that before the middle of the next century, the combined effect of increases in all greenhouse gases will produce an impact on climate roughly equivalent to a doubling of pre-industrial levels of carbon dioxide alone. Based on this assumption, numeric models of the climate system indicate that long-term global average temperatures will increase between 2–9 degrees Fahrenheit. As a point of comparison, average temperatures during the Ice Age, 18,000 years ago, were only about 9 degrees Fahrenheit colder than what is presently observed.

The precision of these estimates is called into question by our limited understanding of the natural processes which drive global climate. Clouds, for example, cover 60 percent of the planet and generally serve to reflect sunlight back into space before it reaches the Earth's surface. Current climate models are inconsistent with respect to the effect of clouds on global temperature. Some models assume that greenhouse gases will thin cloud coverage, thereby increasing temperatures further. However, the most recent climate models indicate that clouds may be "wetter" and therefore, reflect more solar radiation back into space, producing less warming than the initial models predicted.

It is generally safe to conclude, however, that the greenhouse effect is a well established and accepted scientific therory. There appears to be strong scientific consensus that some global warming, through acceleration of the greenhouse effect, is highly probable if the current, heavy worldwide reliance on fossil fuels continues. What is not known is exactly how much, and at what rate, global temperatures will rise given a certain increase in concentration of greenhouse gases, and whether recent meteorological events are related to the observed buildup of greenhouse gases.

Despite the extensive work to date, many uncertainties remain about both the timing and extent of global climate change. Models have frequently given conflicting signals regarding potential effects. Dr. Andrew Solow of the Woods Hole Oceanographic Institution, in his testimony before the Committee, gave the following example to illustrate this point: improved understanding of earth sciences, gained over the last decade, have yielded dramatically re-

duced predictions of sea level rise. In 1980, sea level was expected to rise as much as 7.6 meters over the next 150 years, but current estimates envision a rise of only 1.5 meters over the same period. Large-scale policies aimed at sharply and rapidly curtailing human activities that contribute greenhouse gases to the atmosphere are certain to be controversial and expensive. Given the uncertainties of the science, there is a need for better understanding of global environmental change in shaping policy responses to such change.

Effects of global climate change

Notwithstanding these uncertainties, there is the very real possibility that human activity is changing the earth system in a way that will dramatically affect the global environment. If current predictions prove accurate, there will be worldwide changes in many features of the hydrological cycle, with consequences for soil moisture, river flow, glacial extent, the distribution of crop zones, and fisheries and wildlife populations. In addition, there are reasons to expect that warmer ocean temperatures will lead to more violent and more frequent tropical storms. These changes could have widespread and complex environmental and economic impacts:

Climatic zones and storm tracks may shift toward the poles. Crop zones and ecosystems can be expected to migrate with the changing climate. Extinction of some species may occur or be accelerated.

Melting glaciers and thermal expansion of sea water are expected to raise global sea levels significantly over the next century; reasonable estimates center on a one meter rise. This will increase coastal erosion, wetlands loss, saltwater intrusion, and distribution of marine species.

Warming is expected to be considerably greater in polar latitudes than in the tropics, and sea ice would diminish. A navigable Arctic Ocean would have major national security implications.

Changes in rainfall patterns are likely.

Domestic and international global change research and policy

Scientists, both in the United States and worldwide, have initiated planning for a comprehensive research program to improve our understanding of global change. Internationally, attention has focused on the International Geosphere-Biosphere Program (IGBP). Developed by the International Council of Scientific Unions, this long-term program is planned to begin in the early 1990s. Its specific purpose will be "to describe and understand the interactive physical, chemical, and biological processes that regulate the total Earth system, the unique environment that it provides for life, the changes that are occurring in this system, and the manner in which they are influenced by human actions." The IGBP will attempt to provide the fundamental knowledge needed to permit an assessment of likely changes on the Earth over the next 100 years. It also will provide much needed coordination of world research efforts.

Other international efforts are underway to coordinate response strategies for global climate change. To this end, the Intergovernmental Panel on Climate Change (IPCC), a joint effort of the World Meteorological Organization and the United Nations Environmen-

tal Programme, has established three working groups: Group I (science); Group II (effects); and Group III (response strategies). The United States is the designated chair of Group III. The IPCC has made substantial progress toward developing an international framework convention on climate change and intends to have a draft convention prepared no later than 1992.

In the United States, several groups are involved in developing a long-range national research agenda, including the Office of Science and Technology Policy (OSTP), the National Research Council (NRC), and the Earth Systems Sciences Committee of the National Aeronautics and Space Administration (NASA) Advisory Council. NRC, the operating arm of the National Academy of Sciences, has produced several reports on global change and is developing a comprehensive research proposal outlining the U.S. role in IGBP.

In recent years the Federal Government has spent tens of millions of dollars collecting information and carrying out research which could contribute to our understanding of global change. Because of the breadth of the problem and its widespread effects on our society, a number of different federal agencies are involved. To coordinate these efforts, the Committee on Earth Sciences (CES) was formed in April 1987, under the Federal Coordinating Council for Science, Engineering, and Technology (FCCSET). FCCSET was established by the National Science, Engineering, and Technology Policy and Priorities Act of 1976. It is chaired by the President's Science Advisor and consists of representatives from those federal departments and agencies engaged in scientific research.

The purpose of CES is to increase the overall effectiveness and productivity of federal research and development efforts directed toward understanding the Earth as a global system. In pursuing that objective, CES has endeavored to improve coordination among the global change research programs of existing federal agencies and works closely with the NRC. Federal organizations which are represented on CES include the National Science Foundation, NASA, the National Oceanic and Atmospheric Administration (NOAA), OSTP, the Office of Management and Budget (OMB), the Environmental Protection Agency (EPA), the Council on Environmental Quality (CEQ), and the Departments of Agriculture (USDA), Energy (DOE), Interior (DOI), State (DOS), and Transportation (DOT).

In the past year, CES has made steady progress toward establishing interagency cooperation and defining a federal program on global change. CES achieved a major milestone when it published a report which accompanied the submission of President Bush's fiscal year (FY) 1990 budget proposal. Entitled "Our Changing Planet: A U.S. Strategy for Global Change Research," the report outlines a research strategy and provides the first clear summary by agency and budget function of federal global change research.

One of the most serious obstacles to the development of a comprehensive global change research program is providing for effective coordination of institutional actors. Coordination is needed not only to eliminate unnecessary duplication of effort and ensure that research gaps are filled but also to establish and operate large research projects and experiments which draw on many groups. The

Committee feels that CES is an appropriate mechanism for the coordination of federal research on climate change.

While federal investments in direct research on global change have been modest in recent years, total funding for related activities in areas such as atmospheric research, climate forecasting, and satellite development exceeds $1 billion annually. These contributing activities provide essential information and support services to programs of focused research on global change, which in FY 1989 totaled $133.9 million. The President's FY 1990 budget for global change research proposes a funding level of $190.5 million.

As the challenges of global change becomes better defined, federal spending on associated research is expected to grow. With increases in the size and number of programs, planning and coordination will be vital for allocating funds and preventing duplication of agency efforts. The ongoing interagency research effort would be strengthened by establishing a statutory global change research planning process. This planning process would create a stable framework for the long-term research that is needed to help answer difficult scientific questions about global change and to provide government officials and citizens with the information that they will need to make informed policy choices.

The difficult challenge for policy makers is how to respond to global change when the only apparent evidence of such change is a scientific theory, the prediction of computer models, and the observation of a slight warming over the past century, with the latter two beset by troubling uncertainties. If one gives any credence to current predictions, then it is clear that some action is essential. Waiting for certainty could well commit the world to climate changes at a rate and extent that are unprecedented, and with social and environmental consequences that are unacceptable. With this in mind, the Committee sought to develop a bill that would encourage progress in scientific understanding but would also provide for a concurrent process of policy development.

Global environmental policy: the role of CEQ

The Council on Environmental Quality (CEQ), a three-member, Presidentially-appointed advisory board, was created by the National Environmental Policy Act of 1969 (NEPA). NEPA sets forth the environmental policy of the United States and requires federal agencies undertaking major actions that significantly affect the quality of the human environment to prepare environmental impact statements (EISs) that analyze the potential effects of those activities and evaluate alternatives to them.

The statutory responsibilities of CEQ are:

(1)-to review and evaluate the programs and activities of the Federal Government to determine how they are contributing to the attainment of national environmental goals;

(2) to assist federal agencies and departments in reviewing the effectiveness of their existing and proposed policies and activities affecting environmental quality;

(3) to develop and recommend to the President policies to improve environmental quality;

(4) to advise and assist the President in achieving international cooperation on environmental issues;

(5) to help coordinate environmentally significant actions and policies within the Federal Government, and to help resolve conflicts between federal agencies concerning those issues;

(6) to foster research relating to environmental quality; and

(7) to report annually to the President and the Congress regarding both short and long term environmental issues facing the nation.

In addition, CEQ is responsible, pursuant to Executive Order, for overseeing the implementation of NEPA by federal agencies. CEQ provides guidance to federal agencies on NEPA requirements, comments on proposed NEPA regulations, and mediates disputes between agencies regarding NEPA compliance.

The role of CEQ as the environmental advisor to the President changed considerably under the Reagan Administration. Funding and staffing for CEQ in the early 1980s was cut in half from 1970 levels. However, there is evidence that it is being revitalized under the current Administration. The recent appointment of Mike Deland as CEQ Chairperson and increases in staffing and funding indicate that CEQ's role as environmental advisor to the President may be enhanced in the future.

NEPA and the international environment

The primary environmental review requirements of NEPA (contained in section 102(2)(C)) apply to all "major Federal actions significantly affecting the quality of the human environment."

Despite, or perhaps because of, the broad sweep of this language, there has been a controversy from the time NEPA was enacted whether the statute was intended to apply to federal actions that take place outside, or have significant environmental impacts outside, the jurisdiction of the United States. The statute does not otherwise specify the extent of its reach, nor has the issue been clearly resolved by the courts.

In 1979, President Carter issued Executive Order 12114 requiring federal agencies to take international environmental considerations into account for certain categories of actions. The Executive Order was not based on NEPA and did not, therefore, resolve the legal question as to NEPA's reach. Rather, it sought to address concerns about the international environmental effects of federal actions while avoiding a showdown over the interpretation of NEPA.

Executive Order 12114 required each federal agency taking actions "having significant effects on the environment outside the geographical borders of the United States" to establish procedures for taking those effects into account. The procedures required could include environmental impact statements or less formal environmental assessments or studies, and could, if appropriate, be carried out jointly with other nations.

The Executive Order included a list of exclusions and exemptions related to considerations of national security, national interest, foreign policy, and trade. The Order does not, for example, apply to actions affecting the environment of a nation participating with the United States in that action, thereby excluding joint public works and economic development projects from its scope.

In recent years, increased attention has been paid by the public and by the Federal Government to the wide variety of threats posed to the global environment. For example, some have called for new procedures to assess the environmental effects of economic development projects funded by the World Bank and other multilateral development institutions. In response to these concerns, the United States has taken steps to demonstrate its commitment to solving international environmental problems, including support for a global agreement to reduce dramatically the emission of chemicals that deplete the ozone layer. H.R. 3332 is intended to support these efforts by ensuring that federal agencies do not unwittingly contribute to the very problems we are trying to solve.

The need for change was illustrated by a survey recently conducted by CEQ ("Survey on Executive Order No. 12114", October 21, 1987, CEQ). That survey indicated that the EIS process is rarely used to analyze the effects of federal actions on ozone depletion and global warming. Since NEPA was enacted, only three EISs have addressed these issues, and none since 1978.

On September 9, 1988, CEQ conducted a public meeting on "Global Climate Impact and the NEPA Process." At that meeting, Mr. Dick Sanderson, Director of the Office of Federal Activities of EPA said that:

> Federal agencies currently make long range decisions concerning agriculture, forestry, water resources, coastal zone resources, energy resources and other natural resources with little or no regard for long range climate impacts. Federal projects, funds and licenses for infrastructure development lasting 50 years or more are planned, assessed in EISs and implemented under the assumption that present climate conditions will prevail.

CEQ subsequently prepared draft guidance for federal agencies based on the conclusion that "agencies should begin now to examine how their actions may contribute to, and could be affected by global climatic change." That draft policy guidance, which is consistent with the purposes of H.R. 3332, is currently being circulated for comment within the Executive Branch.

In addition to actions that have a potential effect on global warming or the depletion of the ozone layer, many federal agencies take actions that affect the international environment in a more limited way. These actions include the licensing for export of hazardous materials and pesticides; participating in, or financing of, public works, economic development and other construction project overseas; scientific research activities in the oceans or in polar regions; and other international activities.

Section 301 of H.R. 3332 requires CEQ to issue regulations to ensure the consideration of the significant effects of major federal actions on the environment outside the jurisdiction of the United States. It is the intention of the Committee to improve the effectiveness of NEPA by providing a process for the explicit consideration of global environmental change by federal agencies, thus, resolving questions regarding the application of NEPA to international actions of the Federal Government.

COMMITTEE ACTION

The original bill, H.R. 980, was introduced on Februry 9, 1989, by Mr. Jones of North Carolina, Mr. Studds, Ms. Schneider, Mr. Hertel, Mr. Lent, Mr. Miller of California, Mr. Hughes, Mr. Foglietta, Mr. Tauzin, and Mr. Carper, and was referred jointly to the Committees on Merchant Marine and Fisheries, Science, Space, and Technology, and Interior and Insular Affairs.

On May 4, the Subcommittee on Oceanography and the Great Lakes held a hearing on H.R. 980. Testifying were Dr. William R. Moomaw, Director, Climate, Energy, and Pollution Program, World Resources Institute; Dr. Stephen H. Schneider, National Center for Atmospheric Research; Dr. Andrew Solow, Marine Policy Center, Woods Hole Oceanographic Institute; Mr. Robert W. Slocum, Jr., Executive Vice President, North Carolina Forestry Association, Inc.; Ms. Susan C. Moya, Manager, Energy and Natural Resources Policy Office, United States Chamber of Commerce; Dr. Alan Thomas, Acting Assistant Administrator, Oceanic and Atmospheric Research, NOAA; and Dr. Dallas L. Peck representing CES.

Based on our current understanding of the global climate and limited predictive capabilities, Dr. Moomaw suggested that appropriate policy responses to global environmental change are those policies that have the lowest negative impact on the economy, are most effective in reducing greenhouse gas emissions, and provide additional environmental and economic benefits.

Dr. Schneider's testimony addressed the debate among scientists over the greenhouse effect. He described a growing consensus within the scientific community that average global temperatures are increasing; however, the extent and timing of the warming is unknown and will not be known for at least 10 years. Dr. Schneider testified in favor of H.R. 980 and particularly the comprehensiveness of the bill, especially provisions which address research needs and policy responses to global environmental change.

Dr. Solow testified that H.R. 980 is a reasonable and measured response to concerns over the possibility of climate change. Dr. Solow supported all three titles of the bill.

Mr. Slocum was generally supportive of the bill and title I, in particular. His testimony discussed possible policy responses relative to forestry and urged the Committee to consider the negative effects of the capital gains tax differential on private landowners.

In her testimony, Ms. Moya endorsed the development of the research plan outlined under title I of H.R. 980 and provided several comments on ways to improve titles I and II. Ms. Moya did not support title III provisions to amend NEPA to clarify its extraterritorial applications.

Dr. Thomas supported the purpose of title I of the bill, deferred to CEQ on Title II, and opposed title III, stating that the substance of the provision can be implemented under current law. Specific comments on section 101(c) included a suggestion to amend the agency role statements to coincide with statements developed and approved by the CES. This testimony suggested that additional federal departments and agencies be included in the agency role statements.

NOAA did not provide comments on title II and opposed the enactment of title III, stating that the substance of the provision can be implemented under current law. NOAA testimony stated the Administration is currently reviewing extraterritorial applications of NEPA.

Dr. Peck was supportive of title I generally; however, he suggested section 101(c) be amended to include a description of federal agency and department research responsibilities under the plan. Dr. Peck did not support title II provisions to establish a Council on Global Environmental Policy because this would be duplicative of functions already conducted by CEQ.

The Subcommittee on Oceanography and the Great Lakes and the Subcommittee on Fisheries and Wildlife Conservation and the Environment met on July 19 and ordered H.R. 980 favorably reported to the Committee on Merchant Marine and Fisheries with an amendment in the nature of a substitute.

The substitute, offered by Chairman Jones, made two major changes to the bill, along with a number of minor clarifying and technical changes. Major changes included: deletion of the descriptions of allocations of research responsibilities for federal agencies in section 101(c) and increased emphasis on provisions that enhance interactions between CES and CEQ in carrying out the research policy provisions of the bill.

On September 25, Chairman Jones and Ranking Minority Member Davis introduced a new bill, H.R. 3332, which was referred to the Committees on Merchant Marine and Fisheries, and Science, Space and Technology. The new bill, similar to H.R. 980, made a number of changes to titles I and II of the substitute bill reported by the joint subcommittees. H.R. 3332 differed from H.R. 980 in several respects:

Title I was revised by establishing in the Executive Office of the President a Committee on Earth Sciences (CES) to develop the 10-year "National Global Change Research Plan."

Title II was revised by assigning CEQ the role of coordinating global change policy. CEQ would replace the proposed Council on Global Environmental Policy and act as advisor to the President, in consultation with federal departments, regarding domestic and international policies, plans, and programs of the Federal Government related to global change.

On September 26, the Committee on Merchant Marine and Fisheries met to consider H.R. 980. Chairman Jones requested unanimous consent to consider H.R. 3332, in lieu of H.R. 980, and ordered the bill reported to the House of Representatives with one additional amendment.

This amendment, which was offered by Mr. Jones and approved by voice vote, added a new title requiring the United States to seek international cooperation on the coordination of global change research plans.

SECTION-BY-SECTION ANALYSIS

Section 1. Short title

The short title of this act is the "Global Environment Research and Policy Act of 1989."

Section 2. Findings and purpose

This section contains findings regarding the known scientific, social, and policy implications of global climate change. The section also outlines the purposes of the legislation. The basic thrust of the legislation is to provide for development and implementation of a long-term research program which will investigate the human and natural causes of global change. This research will provide a basis for policy decisions related to global change. The bill sets forth mechanisms for initiating analysis and response strategies aimed at mitigating and adapting to the impacts of global change.

Title I—National Global Change Research Plan

The purpose of title I is to ensure that needed federal research efforts related to global environmental change are ongoing to assist the United States and the world in understanding and coping with global change.

Section 101. Establishment of the Committee on Earth Sciences

Subsection (a) establishes in the Executive Office of the President the Committee on Earth Sciences (CES) as the lead entity for overseeing the implementation of a 10-year interagency research plan. Subsection (b) establishes the membership of CES and designates a process for the selection of a Chairperson. The Chairperson would be chosen biennially from NOAA, NASA, NSF, or DOI members of CES, and representatives of the same agency or department would be precluded from serving as Chairperson for consecutive terms.

CES is an existing, but non-statutory arm of the Office of Science and Technology Policy. This section of the bill would build on the existing structure by giving CES a statutory charter. As the Federal Government's interagency committee for earth sciences, CES is currently charged with planning and coordinating federal agency activities on global change research. Section 101 of the bill would provide CES with new authority to develop and coordinate plans for interagency research on climate change. Such plans would identify critical research needs and provide for cooperation among government, industry, and academic scientists in the United States and overseas.

The Merchant Marine and Fisheries Committee applauds the Administration's initiatives regarding global change, and particularly the activities of CES. However, the Committee also recognizes that a great deal more can and should be done. Title I of this legislation lays out a formal process for the development of a national global change research plan.

Future planning of CES should reflect the additional requirements of this legislation including: changes in the process for selection of the Chairperson of CES as outlined above; prioritization of research activities; specific allocation of research responsibilities among federal agencies; incorporation of the research activities of the National SEA Grant College Program in the plan and reports; and involvement of CES in international scientific activities. This legislation also establishes a process by which CES will make recommendations on agency funding levels to the Administration and Congress, requires CES to develop a process for scientific assess-

ments to be incorporated in the plan, and incorporates the programs of NOAA's National Marine Fisheries Service and the United States Fish and Wildlife Service.

Section 102. Development of a National Global Change Research Plan

Subsection (a) provides for the development of the "National Global Change Research Plan," a 10-year plan for national research on the processes and factors which contribute to global environmental change.

Subsection (b) outlines the contents of the plan. The plan would: identify the goals, priorities, and approaches for global change research to be conducted and funded by the Federal Government; describe the specific role of each federal agency in implementing the plan; recommend allocations of federal funding among specific research activities; provide for the coordination of relevant programs and activities of federal agencies involved in the implementation of the plan; and describe the specific research and other activities to be conducted under the plan.

The plan must also incorporate and coordinate appropriate research activities conducted under the National Sea Grant College Program under subsection (b)(5). The national global change research effort is a massive, multidisciplinary undertaking, one that will require coordination to reduce duplication of efforts and use resources in the most cost-effective manner. Sea Grant should be a vital part of this effort. Subsection (b)(6) requires that the plan coordinate the global change research activities of the United States and other nations and organizations. Thus, this requirement provides a link to section 402 of the bill, requiring the Secretary of State to initiate multilateral discussions leading toward an international protocol in global change research and assessment.

Subsection (c) specifies that the plan provide for the allocation of research responsibilities among federal agencies. The July 1989 CES document, "Our Changing Planet: The FY 1990 Research Plan," describes the research responsibilities of the various federal agencies and departments involved in global change research. It is the intention of the Committee that these roles and responsibilities should be incorporated into the plan. However, the Committee expects that the plan will more clearly identify research priorities and will specifically assign agency responsibilities in meeting those priorities.

Detailed "role statements" for a variety of federal agencies have been provided to the Committee during consideration of this legislation. They are included in this report as a general guide to the programmatic responsibilities of these agencies. However, they also indicate the great potential for overlap and duplicity of effort within this program. Preventing this and establishing clear priorities and responsibilities will be a major challenge for CES.

These roles are:

NOAA conducts operational in situ and satellite observations and monitoring programs; mission-directed research on physical and biogeochemical processes in the climate system (including their effect on marine ecosystems and resources); development, testing and application of models and diagnostic techniques for the detec-

tion and prediction of natural and human-induced climatic changes; and the acquisition, maintenance, and distribution of long-term data bases and related climate information.

NASA is responsible for Earth science research from space, including those studies of broad scientific scope that examine the planet as an integrated whole. Associated efforts include related process studies; sub-orbital and ground-based studies; remote-sensing and advanced instrument development; improvement of techniques for the transmission, processing, archiving, retrieval, and use of data; related scientific models; and other research activities in atmospheric, oceanographic, and land sciences.

NSF supports basic research in all areas of Earth, atmospheric (including solar-terrestrial), and ocean sciences, including the relevant biological and social sciences and research in the polar regions. The basic research program is focused on ground-based studies on regional and global scales; large-scale field programs; interpretation and use of remotely-sensed data and geographic information systems; theoretical and laboratory research; research facilities support; and the development of numerical model, information and communication systems, and data bases.

The research efforts of DOE include the climate's response to greenhouse gas emissions, primarily carbon dioxide emissions, and development of the base of scientific information necessary to assess the climate's response, assuming various energy and industrial policies. Associated efforts include research to quantify the relationships between carbon dioxide and other trace gases and temperature rise, assessment and application of predictive models, evaluation of global and regional climate and environmental responses to various energy policy options, and research on industrial sources of trace gases.

The United States Geological Survey (USGS) addresses the collection, maintenance, analysis, and interpretation of short- and long-term land, water, biological, and other natural resource data and information. Such efforts include, monitoring of hydrologic and geologic processes and resources, land use, land cover, and biological habitats, resources, and diversity. Some USGS research areas would include: past global change recorded in the physical, chemical, and biological record; the hydrologic cycle; land-surface and solid Earth processes that relate to environmental change; geography and cartography; polar and arid region processes; ecosystem modeling and dynamics; and resource ethnology.

EPA conducts research to assess, evaluate, and predict the ecological, environmental, and human-health consequences of global change, including feedbacks of these systems on climate change. Additional areas of activity include research to determine emission factors, and inventories for radiatively important trace gases, and research to predict the interactions between global atmospheric change and regional air and water quality.

USDA conducts research to assess the effects of global change on the agricultural food and fiber production systems and on forests and forest ecosystems including basic research on the biological response mechanisms to increasing greenhouse gases; improvement of plant and animal germ plasm to respond to global change; and development and implementation of plans for terrestrial mitigation

systems to ameliorate the observed increases of greenhouse gases. An additional responsibility includes research on applications of agricultural climatology to improve management decisions and conservation of resources, while maintaining quality and quantity of crop yields.

DOD and DOT currently do not conduct research that is focused on the goals and objectives of CES, although both agencies conduct research that contributes to this effort.

The Merchant Marine and Fisheries Committee is concerned about the relative lack of involvement in ecological research of two key agencies, the United States Fish and Wildlife Service (USFWS) and NOAA, particularly the National Marine Fisheries Service (NMFS). The Committee directs that the plan shall provide for the involvement of these two agencies and that these agencies have well-defined roles under the CES plan.

Pursuant to this, USFWS should have a major responsibility for ecological studies and monitoring and assessment related to the negative impacts of global environmental change to fish and wildlife; prediction, detection, modeling, and assessment of changes in wetlands, terrestrial and aquatic communities, endangered species, fish and wildlife habitats, and biodiversity; and development and management of long-term plans and activities for mitigation of fish and wildlife resources.

NMFS should have responsibility for the collection, analysis, and dissemination of information on the status of fish, marine mammals, and endangered species stocks related to the possible impacts of global environmental change; provide a sound scientific basis for predicting changes in the habitat of living marine resources and the impact of that change upon these resources resulting from global change; and provide timely information concerning the impacts of global change to living marine resources, their habitats, and their use with the assistance of computers and other automated devices.

Under subsection (d), CES is required to use existing reports and studies in the development of the plan. Subsection (e) requires CES to submit the plan to Congress within one year after the date of enactment and to revise the plan at least once every three years under subsection (f).

To ensure that earth science research efforts are adequately addressing related policy questions, CES is required to consult with CEQ in the preparation of the revised plan under subsection (f). CEQ is responsible under section 201 of this bill to coordinate national and international policy responses to global environmental change. In addition, subsection (f) requires CES to address each of the recommendations made by CEQ pursuant to section 201(3). Section 201(3) requires CEQ to recommend to CES the research goals, priorities and approaches which most effectively provide a basis for policy decisions related to global environmental change.

This subsection addresses a major concern of the Committee to foster appropriate consultation between CES and CEQ to ensure appropriate communication between scientists and policy-makers. The Committee intends that CES take the lead role in developing the earth science capabilities related to the prediction of global change so that CEQ may respond with appropriate policy recom-

mendations. Cross-pollination between science and policy is a critical ingredient to the long-term success of this effort. At the same time the Committee is aware of the dangers in making science subservient to policy and vulnerable to political manipulation. This is to be avoided and the process outlined in the bill was drafted with this objective in mind.

Section 103. Implementation of the plan

Subsection (a) provides for implementation of the research plan by CES. CES would coordinate global change research activities among federal agencies, report annually to the President and Congress, and consult with users of information systems to promote consistent and efficient transfer and use of data obtained from research conducted under the plan.

Under paragraphs (3) and (4), CES would be required to work with the National Research Council and with academic, State, and other groups conducting research and assessments of global changes and their effects and to coordinate interagency participation in international activities related to global change research and assessments.

These provisions are designed to provide a means to interpret and communicate scientific information to policy-makers. To accomplish this, there must be a method of assessing the value and meaning of science to policy-makers. Assessment, in this context, is an iterative process of synthesizing and integrating technical information into a form relevant for decision making. The benefits of assessments derive from the process used to assemble them as well as the resulting products.

The assessment process requires the following key components: development of an analytic framework for organizing the information; identification of key technical and policy issues; explicit definition of underlying assumptions; and building of consensus on the status of knowledge and its policy implications. Scientific information is only one component of what policymakers must consider in developing societal actions. Paragraphs (3) and (4) of this subsection provide a bridge between scientific research and objective policy decisions. Assessments should provide both policy and technical insights not obtainable from the numerous individual sources.

Subsection (b) requires the Chairperson and the Secretary of State to cooperate in providing representation at international governmental meetings and conferences on global change in which the United States participates.

Section 104. Coordination of Federal agency budget activities related to climate change

This section requires each federal agency involved in global change research to include in its annual request for appropriations a report to the President and CES. The report will identify each element of the agency's proposed global change activities stating how it contributes to the implementation of the plan and the specific request for appropriations under each element. Under subsection (b), the President is required to identify in the annual budget submitted to Congress the portion of each agency's annual budget that is allocated to global change activities.

The purpose of this budget review process is to ensure that CES has a direct role in allocation of federal resources toward research in global change. The Committee notes that CES has apparently been granted broad authority already. However, the provisions of this subsection would formalize this authority. Similar budget recommendation authority exists for the National Ocean Pollution Policy Board under the National Ocean Pollution Planning Act (31 U.S.C. 1701 et seq.)

Section 105. Climate change reports

This section requires the Chairperson to report on the specific activities of CES at least once every three years, including a summary of the achievements of federal global change research efforts, an analysis of the progress made toward achieving the objectives of the plan and recommendations regarding additional action or legislation which may be required to assist in achieving the purposes of this act. Upon the completion of research activities specified under the plan, subsection (b) requires that a final report be submitted to the President and Congress within ten years of enactment.

Title II—Global Change Policy

The purpose of title II is to provide for the development of national and international policy response measures through the Executive Office of the President's Council on Environmental Quality.

Section 201. Functions of the council on environmental quality

This section outlines the functions of CEQ in advising the President on domestic and international policies, plans, and programs related to global environmental change. CEQ would recommend approaches for coordination of policies and programs of all federal and state agencies related to the impacts of global environmental change and make use of scientific findings and recommendations that result from implementation of the plan.

CEQ would also make recommendations to CES on the research goals and priorities which most effectively provide a basis for policy decisions related to global environmental change. Paragraph (3) further clarifies the relationship between CES and CEQ by requiring CEQ to recommend to the CES the research goals, priorities, and approaches which most effectively provide a basis for policy decisions related to global environmental change. Finally, CEQ would initiate and coordinate studies funded or conducted by the Federal Government related to the social and economic impacts of global change and related policy.

The Global Climate Protection Act of 1987 (GCPA) sets out the goals of United States policy related to global climate change and requires the President, through EPA, to develop and propose to Congress by December 22, 1989, a coordinated national policy on climate change. The activities of EPA under GCPA are primarily focused on climate change, as compared to the broader focus of CES activities on the effects of climate on the global environment. The Committee supports the process that has begun under GCPA and intends to build upon this by providing a mandate for the de-

velopment of a comprehensive national plan of research and policy responses to global environmental change.

Section 202. Global change policy report

This section requires CEQ to report annually to the President and Congress regarding global environmental change activities during the preceding year and related regulatory and legislative matters. Subsection (b) requires CEQ to submit a policy report to the President and Congress consisting of a comprehensive program to abate, mitigate, and adapt to the impacts of global environmental change. The Committee emphasizes that the bill requires this report not later than 5 years after enactment. CEQ is encouraged to provide this report as soon as possible, recognizing the obvious complexity of the subject. Subsection (c) requires CEQ to report annually to Congress regarding the recommendations made to the Committee pursuant to section 201(3) of H.R. 3332.

Title III—Miscellaneous

Section 301. Impact of agency actions on the environment outside United States jurisdiction

The purpose of this section is to ensure consideration of the environmental effects of major federal agency actions on areas outside United States jurisdiction. Subsection (a)(1) requires CEQ to issue regulations within one year of the date of enactment to ensure the consideration, pursuant to section 102(2)(C) of NEPA, of the significant effects of major federal actions on the environment of the global commons. The global commons are those areas, such as Antarctica, the high seas, and the atmosphere, that do not lie within the exclusive jurisdiction of any nation.

Subsection (a)(2) requires that CEQ regulations ensure that federal agencies assess the effects of their actions, including extraterritorial actions, on the environment outside the jurisdiction of the United States. This would include the consideration of transboundary pollution or other environmental impacts within the jurisdiction of a foreign country. These regulations, unlike those required by subsection (a)(1), further the objectives of NEPA, but are not subject to the requirements of section 102(2)(C) of that Act.

Subsection (b) provides that the regulations required by this section should be consistent with the national security and foreign policy of the United States and shall include guidance for assessing the effects of major federal actions on certain specified matters of international environmental concern.

This section would have two major effects:

First, it ensures that federal agencies will meet their obligation under NEPA to consider the significant effects of their major actions on the global commons.

Second, it ensures more generally that agencies will review the possible environmental effects of their proposed actions on areas outside United States jurisdiction. In this respect, the Committee intends that the regulations issued under section 301 shall supersede Executvie Order 12114, taking into account the best available information about threats to the global environment, and reflect

the importance of demonstrating United States leadership on international environmental issues.

The Committee intends that the regulations issued under section (b) should be generally applicable, unlike Executive Order 12114, to actions carried out jointly by the United States and a foreign governments. Agencies should be instructed to coordinate the environmental review of their planned activities with the government of the affected nation and should seek the full participation and comment of that government in carrying out environmental assessment or review procedures. Each participating government should determine the appropriate level of public participation and comment by its own citizens.

For reasons of national security or foriegn policy, CEQ may decide to maintain any of the exemptions to formal environmental review that are contained in Executive Order 12114, including those involving armed conflict, intelligence activities, and votes and other actions in international conferences and organizations. The Committee notes that certain law enforcement activities are so intertwined with national security or foreign policy (for example, suppression of international narcotics trafficking) that they are likely to be excluded from the regulatory process established by CEQ under H.R. 3332.

Taken together, the requirements of this section should ensure the formal assessment of all major federal agency actions having significant effect on the environment outside U.S. jurisdiction to the extent this is consistent with the national security and foreign policy of the United States.

The regulations issued under this section shall include guidance to assist federal agencies in assessing the effects of their actions on loss of biological diversity. The Committee intends that the regulations on this point, which are not exempted under section (b)(1), shall be applicable to all agency actions, whether the effects of those actions occur within or outside the jurisdiction of the United States.

The Committee intends that the guidelines on biological diversity shall be developed in consultation with governmental and non-governmental scientific authorities and that they include instructions for addressing the major factors that contribute to the loss of biological diversity, including loss or degradation of habitat; pollution; the introduction of new or exotic species of plant or animal life; and the direct or indirect destruction of plant and animal populations.

Section 302. Definitions

This section includes a "global change" and other relevant terms of this bill.

Section 303. Appropriations authorization

This section authorizes appropriations of not more than $2.0 million for each of the fiscal years 1990 and 1991 to the CEQ for carrying out the activities specified in the bill.

Title IV—International Programs in Global Change Research

Section 401. United States policy

This section would set forth as the policy of the United States the following principles: promotion and support of international cooperative research and assessment programs aimed at understanding and responding to global change; involvement of scientists and policymakers from developing nations in cooperative research and assessment programs; and promotion of international efforts to provide technical and other assistance to developing nations which will facilitate improvements in their domestic standard of living while minimizing damage to the global or regional environment.

Section 402. Initiation of international discussion

This section would require the Secretary of State, in cooperation with CES, to initiate discussions with other nations leading toward an international protocol on global change research and assessment. These discussions would include issues such was the allocation of costs in global change research and assessment programs; management of global change research and assessment; training centers for scientists from developing nations; establishment of research and assessment centers in developing nations; innovative methods for international research and assessment management; and the prompt establishment of international projects.

The adoption of an international protocol on scientific research pursuant to this section is intended to minimize the instances of duplicative national global change research efforts. In addition, the Committee intends that the international coordination of national research and assessment plans and the sharing of the results of such research efforts.

Subsection (b) would require the Secretary of State, in cooperation with the Secretary of Energy, to initiate discussion with other nations leading to an international research protocol for environmentally safe energy technologies. These discussions would include issues such as the creation of an international cooperative program to fund research related to energy efficiency and solar and other renewable energy sources; creation of an international cooperative program to develop low cost energy technologies; and exchange of information concerning environmentally safe energy technologies and practices.

INFLATIONARY IMPACT STATEMENT

Pursuant to clause 2(l)(4) of Rule XI of the Rules of the House of Representatives, the Committee estimates that the enactment of H.R. 3332 will have no significant inflationary impact on prices and costs in the operation of the national economy.

COST OF THE LEGISLATION

Clause 7(a) of Rule XIII of the Rules of the House of Representatives requires an estimate by the Committee of the costs which would be incurred in carrying out H.R. 3332. However, clause 7(d) provides that this requirement does not apply when the Committee has included in its report a timely submitted cost estimate of the

bill prepared by the Director of the Congressional Budget Office under section 403 of the Congressional Budget Act of 1974.

COMPLIANCE WITH HOUSE RULE XI

1. The Subcommittee on Oceanography and the Great Lakes held hearings on global climate change on May 4, 1989. The hearing included testimony on H.R. 980, the predecessor bill to H.R. 3332. The hearing focused on the need for a coordinated national policy and research program to respond to global climate change.

2. With respect to the requirement of clause 2(l)(3)(B) of Rule XI of the Rules of the House of Representatives and section 308(a) of the Congressional Budget Act of 1974, H.R. 3332 does not contain any new budget authority, spending authority, credit authority, or an increase or decrease in revenues or tax expenditures.

3. With respect to the requirement of clause 2(l)(3)(D) of Rule XI of the Rules of the House of Representatives, the Committee has received no report of oversight findings and recommendations from the Committee on Government Operations on the subject of H.R. 3332.

4. With respect to the requirement of clause 2(l)(3)(C) of Rule XI of the Rules of the House of Representatives and section 403 of the Congressional Budget Act of 1974, the Committee has received the following cost estimate for H.R. 3332 from the Director of the Congressional Budget Office.

U.S. CONGRESS,
CONGRESSIONAL BUDGET OFFICE,
Washington DC, November 15, 1989.

Hon. WALTER B. JONES,
Chairman, Committee on Merchant Marine and Fisheries, U.S. House of Representatives, Washington, DC.

DEAR MR. CHAIRMAN: The Congressional Budget Office has prepared the attached cost estimate for H.R. 3332, the Global Environment Research and Policy Act of 1989.

If you wish further details on this estimate, we will be pleased to provide them.

Sincerely,

ROBERT D. REISCHAUER, *Director.*

CONGRESSIONAL BUDGET OFFICE—COST ESTIMATE

1. Bill number: H.R. 3332.

2. Bill title: Global Environment Research and Policy Act of 1989.

3. Bill status: As ordered reported by the House Committee on Merchant Marine and Fisheries, September 26, 1989.

4. Bill purpose: H.R. 3332 would require that the Administration develop a 10-year National Global Change Research Plan,and would designate the Committee on Earth Sciences in the Executive Office of the President as the lead federal agency for overseeing the development of the plan. The bill would also require that the Council on Environmental Quality (CEQ) issue regulations providing guidance for agencies monitoring global climate change. To fund these activities, the bill would authorize the appropriation of $2 million annually for fiscal years 1990 and 1991. H.R. 3332 would also require the State Department to initiate international discus-

sions on global change research and the development of environmentally safe energy technologies.

5. Estimated cost to the Federal Government:

[By fiscal year, in millions of dollars]

	1990	1991	1992	1993	1994
Authorization level	2	2			
Estimated outlays	2	2			

The costs of this bill would be in budget function 800.

Basis of estimate: This estimate assumes that the full amounts authorized would be appropriated for each fiscal year, and that the authorization for fiscal year 1990 would be in addition to the amount already appropriated in the 1990 Veterans Affairs, Housing and Urban Development, Independent Agencies appropriations bill (Public Law 101-144). The estimated outlays are based on historical spending patterns. CBO estimates that other requirements of the bill—such as development of the research plan and the international negotiations—would not significantly increase federal costs over the next several years because similar activities are already underway.

6. Estimated cost to State and local governments: None.

7. Estimate comparison: None.

8. Previous CBO estimate: None.

Estimate prepared by: Michael Sieverts.

10. Estimate approved by: James L. Blum, Assistant Director for Budget Analysis.

CHANGES IN EXISTING LAW

If enacted, H.R. 3332 would make no changes in existing law.

DEPARTMENTAL REPORTS

The Committee has received no departmental reports on H.R. 3332.

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